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us have been made, and whether the work will go on until issues of the *Vicksburg Citizen* become as widely diffused as those of the *Ulster County Gazette* are interesting questions. Enough has been said to enlighten the reader concerning the general situation with respect to these two papers, and to discourage the entertainment of undue expectations concerning the historical interest or financial value which attaches to any copy of them he may happen to possess.

M. M. QUAIFFE.

TWO EARLY ELECTRIC PLANTS IN WISCONSIN

Because of its unique topography Wisconsin possesses an abundant supply of water power which makes it rank high among the states in the possession of that resource. A wide, flat highland, varying in height from 1,900 feet in the eastern part to 1,000 feet in the western, crosses the northern part of the state, and from it the rivers descend in every direction except eastward. Because Lakes Superior and Michigan bound the state on the north and east and the Mississippi River on the west and southwest, all rivers must find a low trough at a short distance from their source into which to discharge. A rapid fall and large water powers are the result.¹

The importance of water power in a state with no coal supply is enormous. The need and opportunity for the development of this resource were early realized, and Wisconsin soon became the field for the operations of electrical engineers. J. N. Cadby, a consulting engineer, of Madison, has kindly furnished from his correspondence the data for the following descriptions of two of the earliest electric plants in the state, one in Appleton, the other in Burkhardt.

The first commercial electric lighting plant in the United States was, so far as is known, the Appleton Edison Light Company, which began operations August 20, 1882. It thus antedates by two weeks the New York Edison Electric Illuminating Company, started September 4 of the same year, which is generally regarded as the first of its kind. In the Appleton plant was installed a dynamo known as the K type, its capacity being 250 16-candlepower lamps, 120 volts D. C. As there were no meters with which to measure the current,

¹ Leonard S. Smith, *The Waterpowers of Wisconsin*, Wisconsin Geological and Natural History Bulletin, XX, 9.

a charge to mill customers was made at the rate of \$2 a lamp a month when the lamps were burned fifteen hours each night. Residence lighting was charged at the rate of \$7 a lamp a year. The charge for a 16-candlepower lamp was \$1.40. Lamp renewals were furnished by the company.

The place furnished with electricity farthest from the station was the Waverly House, a little over a mile away, which was supplied with thirty lights. The amount of copper required at 110 volts was necessarily very large. Bare copper wires were used for this line, the sizes being Nos. 5, 6, and 7.

The first places supplied with lights by the company were: Appleton Paper and Pulp Company, Tiago Company (paper mill), Vulcan Paper Mill, Atlas Paper Mill, Appleton Waterworks, and the residences of H. J. Rogers, F. H. Blood, George Miller, Peter Thom, and Captain N. E. Morgan.

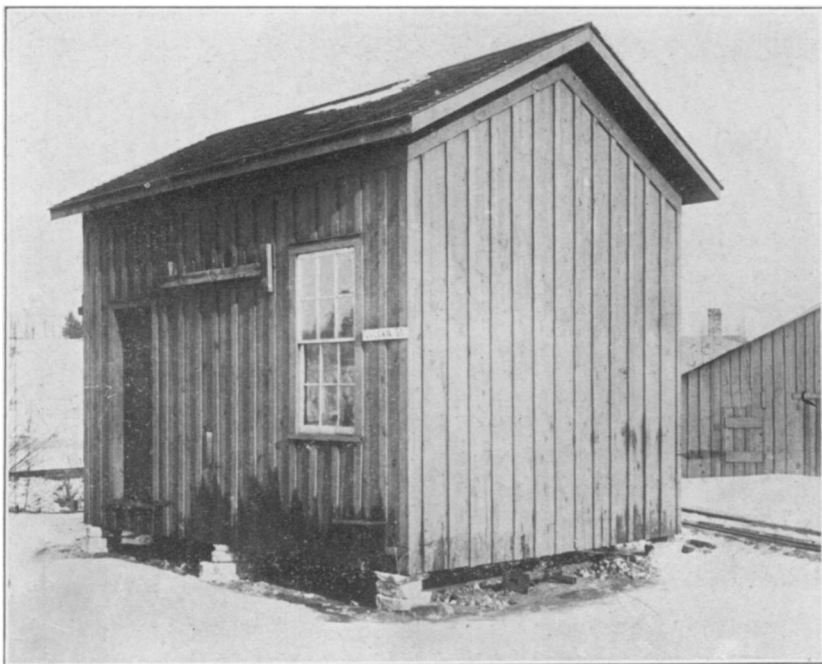
In 1883 another station of the same capacity was built a mile distant from the first station and from it mills and residences in another part of the city were supplied. Both stations were operated on the two-wire system.

A new central station was built in 1885 and into it were moved the two dynamos. Two new generators, operating at 160 volts, were added to the equipment and were operated on the three-wire system. Machines of this special higher voltage were used in order to save copper, for water power was a secondary consideration, and it was figured that fifty volts would be lost in the feeders supplying the uptown districts.

Electrical apparatus in those days was very crude. There were no voltmeters or amperemeters installed in these early plants; the candlepower of a lamp was judged by looking at the light. Fuse blocks, plugs, and lamp sockets were made of wood.

The first officers of the Appleton Edison Light Company were as follows: president, A. L. Smith; vice president, H. J. Rogers; secretary and treasurer, Charles Beverage; superintendent and electrician, W. D. Kurz. Of these men Mr. Kurz is the only one now living.

Concerning the company's claims to being the first commercial lighting company in the United States, Samuel Insull, head of several



**FIRST CENTRAL ELECTRIC LIGHTING PLANT
IN THE UNITED STATES**



THE BURKHARDT MILLING AND ELECTRIC POWER PLANT

large electric systems in Chicago and vicinity, who was an assistant to Thomas A. Edison in his early work, writes:²

The first commercial central-station plant erected anywhere was that installed by the Edison Electric Illuminating Company of New York. It served a territory about a mile square, extending as far south as Wall Street. The station was located on Pearl Street one or two doors south of Fulton Street. The system employed was the Edison two-wire main-and-feeder system. It was put into operation September 4, 1882. Some time after the construction of the New York plant was begun, a small central-station plant, of only 250 16-candlepower incandescent lamps, driven by water power, was projected at Appleton, Wisconsin. The Appleton plant was started August 20, 1882, just two weeks before the New York station was put into operation; so that, judging by the date on which the first commercial plant was put into operation, while New York can lay claim to the credit of projecting the first central station system, Appleton, Wisconsin, in the heart of the Central West, seems entitled to the credit of putting into operation the first commercial central station and to have been a pioneer in a business which in less than three decades has grown from nothing to an investment in this country alone which can only be expressed in ten figures.

One of the first transmission lines in this section of the country was built by Christian Burkhardt in St. Croix County in the fall of 1891. During the summer of that year Mr. Burkhardt had attended the Electrical Exposition at Frankfurt-on-the-Main, and had visited a power plant then furnishing 1,000 horsepower for a transmission line of 115 miles with 30,000 voltage, between Laufen on the Neckar River and Frankfurt. On his return he began the construction of a wooden dam with a sixteen-foot head on Willow River, one mile north of Burkhardt.

The power house was a frame structure; American turbines made in Ohio, capacity seventy-five horsepower under an eighteen-foot head, were used. A direct-current, forty-horsepower motor and a fifty-horsepower generator built by the Rockford Electric Company were installed. The length of the transmission line was about a mile, voltage 500. The plant was completed in 1892 and furnished the additional power for operating the Burkhardt flour mill until 1914 when the plant now in use was built on Willow River.

MARGUERITE JENISON.

² Samuel Insull, *Central Station Electric Service* (Chicago, 1915), 146-47.